

West Nile Virus

2013 Final Report

Iowa Department of Public Health
Center for Acute Disease Epidemiology
Division of ADPER and Environmental Health



Background

West Nile virus (WNV) is a mosquito-borne virus that has been documented in Europe, the Middle East, Africa, India, parts of Asia, and Australia. The virus was first identified in the West Nile district of Uganda in 1937. It was first reported in the United States in 1999, when 62 cases and 7 deaths from West Nile virus infection were reported in the New York City area. Since 1999, West Nile virus has spread across the continental United States. The virus was identified in a dead crow in the eastern part of Iowa in September 2001. Human cases in Iowa have been reported every year since 2002.

WNV is endemic in Iowa and activity usually peaks in late summer and early fall. Iowa law requires domestic and imported WNV diseases to be reported to the Iowa Department of Public Health (IDPH) in a timely manner. IDPH then works in collaboration with Local Public Health (LPH) and other appropriate partners to investigate all reported cases.

Over the last several years, the number of reported WNV human illnesses in Iowa has increased annually. During the 2013 surveillance season, 44 cases of WNV infection were reported to IDPH. The 44 reported cases in 2013 represent a 42% increase from the 31 WNV cases reported in 2012, and a nearly 390% increase from the 9 cases reported in 2011 (Figure 1, Table 1).

Table 1. Reported West Nile virus disease cases and presumptive viremic blood donors, Iowa, 2008 - 2013

Year	Neuroinvasive cases	Non-neuroinvasive cases	Total # cases	Reported Deaths	Presumptive viremic blood donors [†]
2008	3	3	6	1	2
2009	0	5	5	0	1
2010	5	4	9	2	1
2011	5	4	9	0	0
2012	11	20	31	0	6
2013	24	20	44	0	12

[†]Presumptive viremic blood donors (PVDs) are people who had no symptoms at the time of donating blood through a blood collection agency, but whose blood tested positive when screened for the presence of West Nile virus.

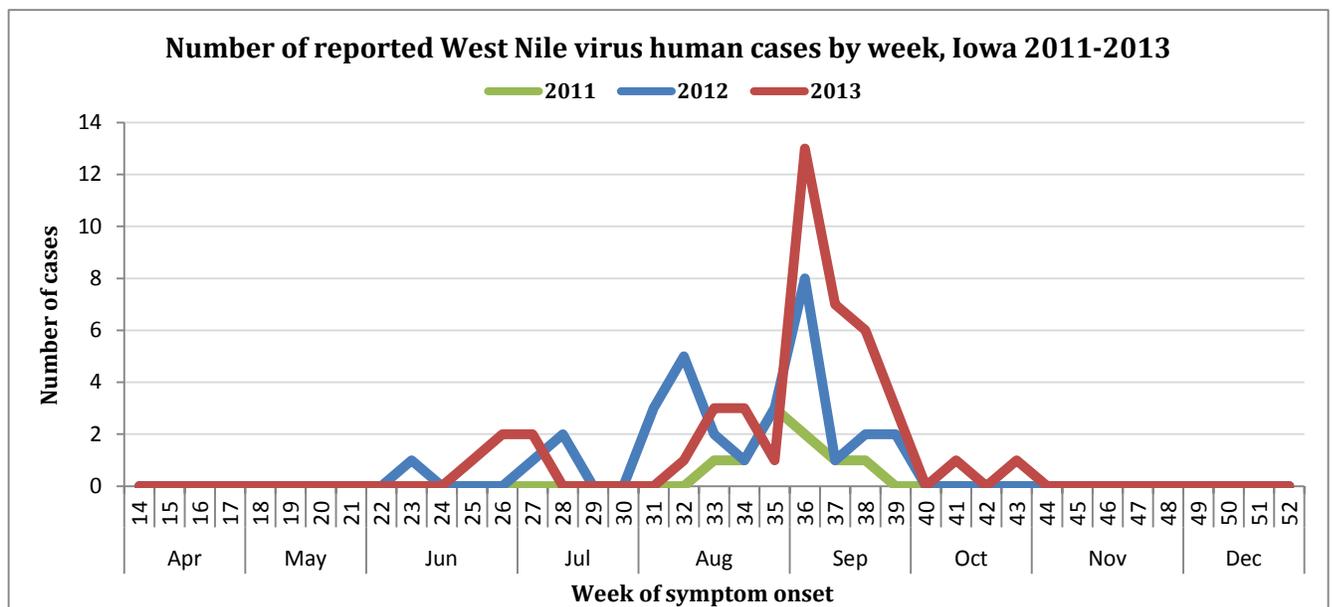


Figure 1. Number of reported West Nile virus cases- Iowa, 2011-2013

Human Surveillance Data

In 2013, a total of 44 human cases of WNV were reported statewide, in 26 Iowa counties (Table 2). Of the 44 cases, 24 (55%) had neuroinvasive illness and 20 (45%) had non-neuroinvasive illness. Of the 44 total cases, 77% were hospitalized (Table 3).

While cases of WNV were reported in 26 counties across Iowa, most of the cases occurred in the western part of the state (Figure 2). The statewide incidence of WNV illness in 2013 was 1.4 cases per 100,000 populations.

In addition, blood donors are routinely screened for WNV infection by blood centers. A total of 12 WNV Presumptive Viremic Blood Donors (PVDs) were reported in Iowa in 2013. PVDs are people who had no symptoms at the time of donating blood, but whose blood tested positive when screened for the presence of WNV.

Table 2. Reported Human West Nile virus cases by local jurisdiction, Iowa, 2013

County	Neuroinvasive Cases*	Non-neuroinvasive Cases	Total # of cases	Presumptive viremic blood donors†
Audubon	1	0	1	0
Cass	0	1	1	0
Crawford	1	1	2	0
Dallas	1	0	1	0
Dickinson	0	1	1	0
Fayette	0	1	1	0
Fremont	1	0	1	0
Hamilton	1	0	1	0
Harrison	1	0	1	0
Humboldt	0	2	2	0
Ida	0	1	1	0
Jasper	1	0	1	0
Kossuth	1	0	1	0
Lee	0	0	0	1
Linn	0	1	1	0
Lyon	0	2	2	0
Monona	3	1	4	0
Monroe	0	1	1	0
Montgomery	1	1	2	0
Plymouth	0	1	1	0
Polk	1	0	1	3
Pottawattamie	4	0	4	1
Ringgold	1	0	1	1
Scott	0	1	1	0
Shelby	0	1	1	3
Van Buren	1	0	1	0
Webster	0	0	0	1
Woodbury	5	4	9	2
State Total	24	20	44	12

*Includes cases reported as meningitis, encephalitis, or acute flaccid paralysis

†Presumptive viremic blood donors (PVDs) are people who had no symptoms at the time of donating blood through a blood collection agency, but whose blood tested positive when screened for the presence of West Nile virus.

Table 3. Characteristics of reported WNV disease cases, Iowa, 2013

	Neuroinvasive (N = 24) No. (%)	Non-neuroinvasive (N = 20) No. (%)
Gender		
Male	13 (54)	10 (50)
Female	11 (46)	10 (50)
Age		
<20	1 (4)	0 (0)
20-39	3 (12)	3 (15)
40-59	11 (46)	12 (60)
≥60	9 (38)	5 (25)
Race		
White	18 (75)	12 (60)
Black	0 (0)	0 (0)
Unknown	6 (25)	8 (40)
Ethnicity		
Hispanic	0 (0)	0 (0)
Non-Hispanic	17 (71)	11 (55)
Unknown	7 (29)	9 (45)
Clinical Syndrome		
Neuroinvasive (Encephalitis, Meningitis, Meningoencephalitis)	24 (55)	0 (0)
Non-neuroinvasive ("West Nile fever")	0 (0)	20 (45)
Symptoms		
Altered sensorium	6 (25)	3 (15)
Anorexia	6 (25)	7 (35)
Coma	0 (0)	1 (5)
Confusion /Memory loss	14 (58)	8 (40)
Cranial nerve palsy	0 (0)	0 (0)
Fatigue	13 (54)	15 (75)
Fever	24 (100)	20 (100)
Flaccid Paralysis	3 (13)	0 (0)
Headache	17 (71)	12 (60)
Joint pain	12 (50)	13 (65)
Muscle pain	12 (50)	10 (50)
Nausea	16 (67)	9 (45)
Photophobia	6 (25)	2 (10)
Rash	11 (45)	8 (40)
Seizures	1 (4)	1 (5)
Swollen lymph nodes	2 (8)	1 (5)
Vision loss	5 (21)	0 (0)
Vomiting	16 (67)	6 (30)
Outcome		
Hospitalized	23 (96)	11 (55)
Death	0 (0)	0 (0)

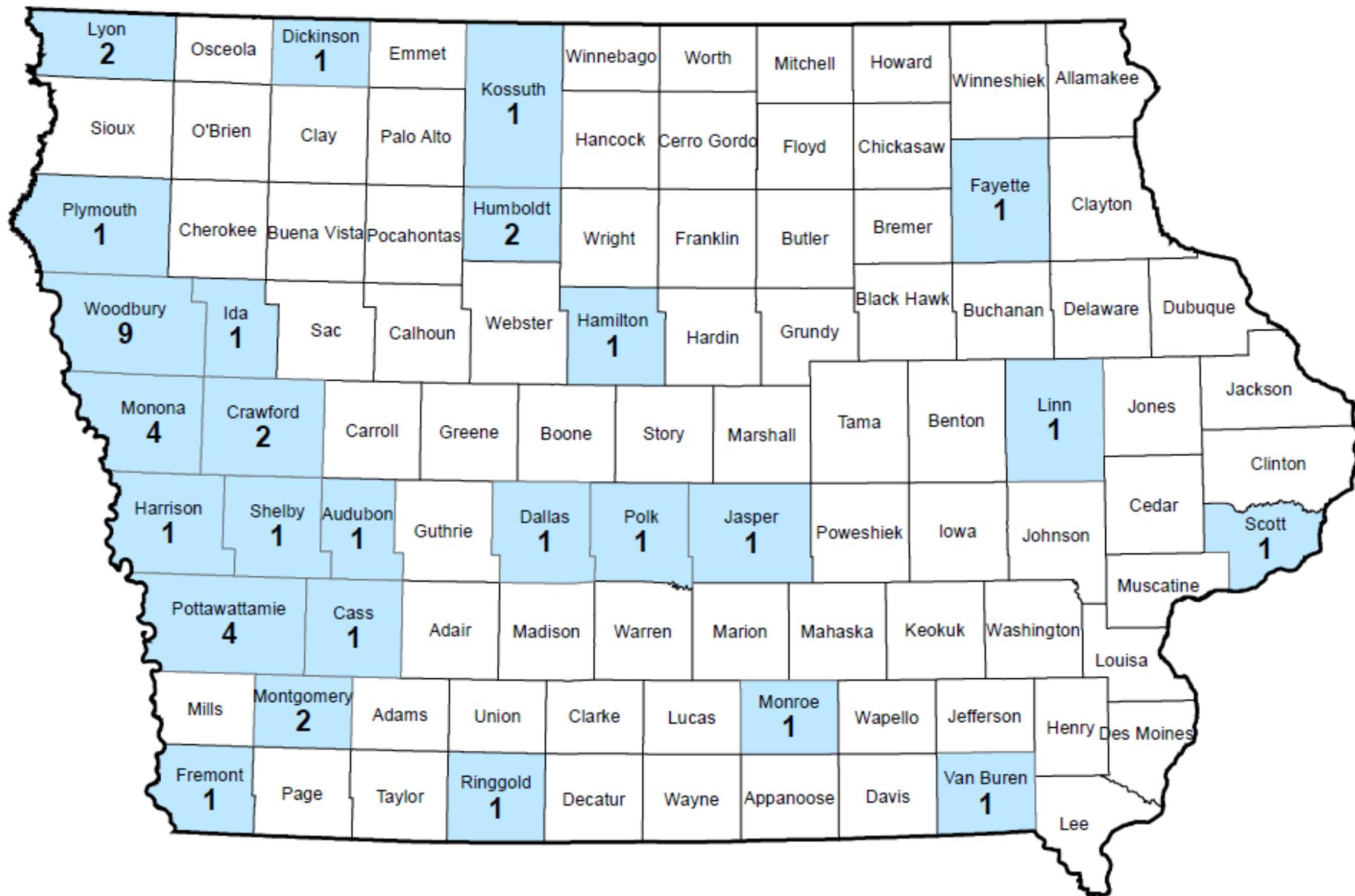


Figure 2. Number of human WNV disease cases reported, by county - Iowa, 2013

Ecological Surveillance

In 2013, the Iowa Department of Public Health in collaboration with the State Hygienic Laboratory (SHL), Iowa State University (ISU), and local public environmental health partners conducted ecological surveillance in 5 counties across the state by monitoring mosquitoes and testing for infected populations and maintaining sentinel chicken flocks weekly to detect infection.

In 2013, 15 sentinel chickens, 66 mosquito pools and 11 horses tested positive for WNV.

Table 4. Sentinel Chicken and Mosquito Surveillance, 2013 Positive Samples

County	Horses	Sentinel Chickens	<i>Culex pipiens</i> Complex	<i>Culex tarsalis</i>
Cerro Gordo	1	N/A	N/A	N/A
Dallas	1	N/A	N/A	N/A
Davis	1	N/A	N/A	N/A
Grundy	1	N/A	N/A	N/A
Jackson	2	N/A	N/A	N/A
Jasper	1	N/A	N/A	N/A
Polk	2	1	21	0
Pottawattamie	0	8	1	1
Scott	0	4	0	0
Story	0	0	28	1
Union	1	N/A	N/A	N/A
Van Buren	1	N/A	N/A	N/A
Woodbury	0	2	13	1
State Total	11	15	63	3

Mosquito Surveillance

Mosquitoes were collected using CDC CO2 traps and New Jersey gravid traps in 4 (Black Hawk, Pottawattamie, Scott, Woodbury) counties in Iowa. These mosquitoes were speciated at ISU and sent to SHL for viral testing. In 2013 *Culex pipiens*, *Culex tarsalis*, *Culex territans*, *Culex erraticus* and *Anopheles punctipennis* were tested for WNV and St. Louis Encephalitis (SLE). *Culex tarsalis* was also tested for Western Equine Encephalitis (WEE). *Aedes triseriatus* and *Aedes japonicus* were tested for LaCross (LAC).

In 2013, SHL tested 640 pools of mosquitos speciated at ISU. In total, 66 mosquito pools tested positive for WNV. Of the 66, 63 were from *Culex pipiens* pools and three were from *Culex tarsalis* pools. No mosquito pools received in 2013 tested positive for SLE, WEE or LAC. The overall positivity rate for WNV testing in 2013 was 12.9% (66/512).

Table 5. Detailed mosquito pools results

Species	# of Pools	WNV	WNV	SLE	SLE	WEE	WEE	LAC	LAC
		Negative	Positive	Negative	Positive	Negative	Positive	Negative	Positive
Cx. pipiens	335	272	63	335	0	N/A	N/A	N/A	N/A
Cx. tarsalis	87	84	3	87	0	82	0	N/A	N/A
Cx. territans	11	11	0	11	0	N/A	N/A	N/A	N/A
Cx. erraticus	23	23	0	23	0	N/A	N/A	N/A	N/A
Ae. triseriatus	128	N/A	N/A	N/A	N/A	N/A	N/A	128	0
Ae. japonicus	54	54	0	N/A	N/A	N/A	N/A	54	0
An. punctipennis	2	2	0	2	0	N/A	N/A	N/A	N/A
Total	640	446	66	458	0	82	0	182	0

Sentinel Chickens

A total of five sentinel chicken flocks (each containing 8 birds) were placed in 5 counties (Polk, Pottawattamie, Scott, Story and Woodbury). LPH collected blood from each bird weekly from June through October 2013 and SHL for tested for WNV. One thousand and ten WNV IgM tests were performed on 55 sentinel chickens of which 15 were positive for WNV IgM by the end of the season.

Equine/Veterinary Surveillance

Veterinary cases of WNV, EEE, and WEE are legally required to be reported to the State Veterinarian. Eleven WNV positive horses were reported to the Iowa Department of Agriculture and Land Stewardship in 2013.

National WNV Activity (2013)

In 2013, 1,288 counties in 48 states reported WNV activity (human and ecological) to ArboNET; 789 counties in 47 states and the District of Columbia reported WNV human disease cases or presumptive viremic blood donors.

In 2013, a total of 2,469 human cases of WNV disease were reported from 725 counties in 47 states and the District of Columbia (Figure 4). Of all WNV disease cases reported, 1,267 (51%) were classified as neuroinvasive disease (e.g., meningitis, encephalitis, acute flaccid paralysis) [Figure 5]. Ninety percent of the reported cases had onset of illness in July-September (Figure 3).

In addition, 431 WNV presumptive viremic blood donors were reported from 36 states.

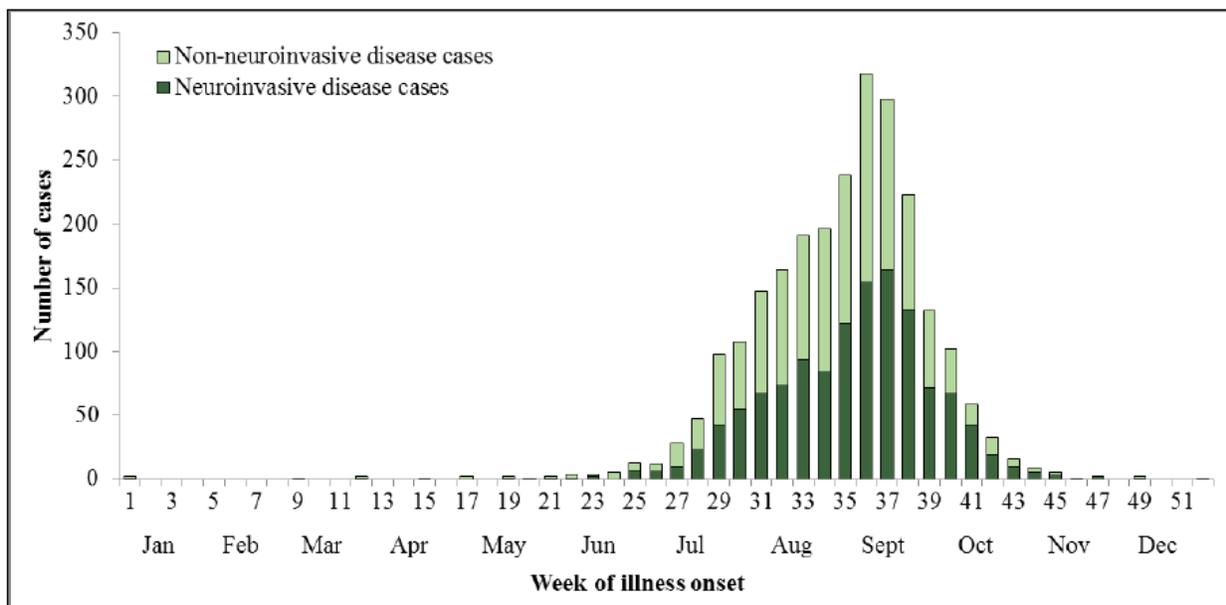


Figure 3. WNV disease cases reported to ArboNET, by week of onset - United States, 2013

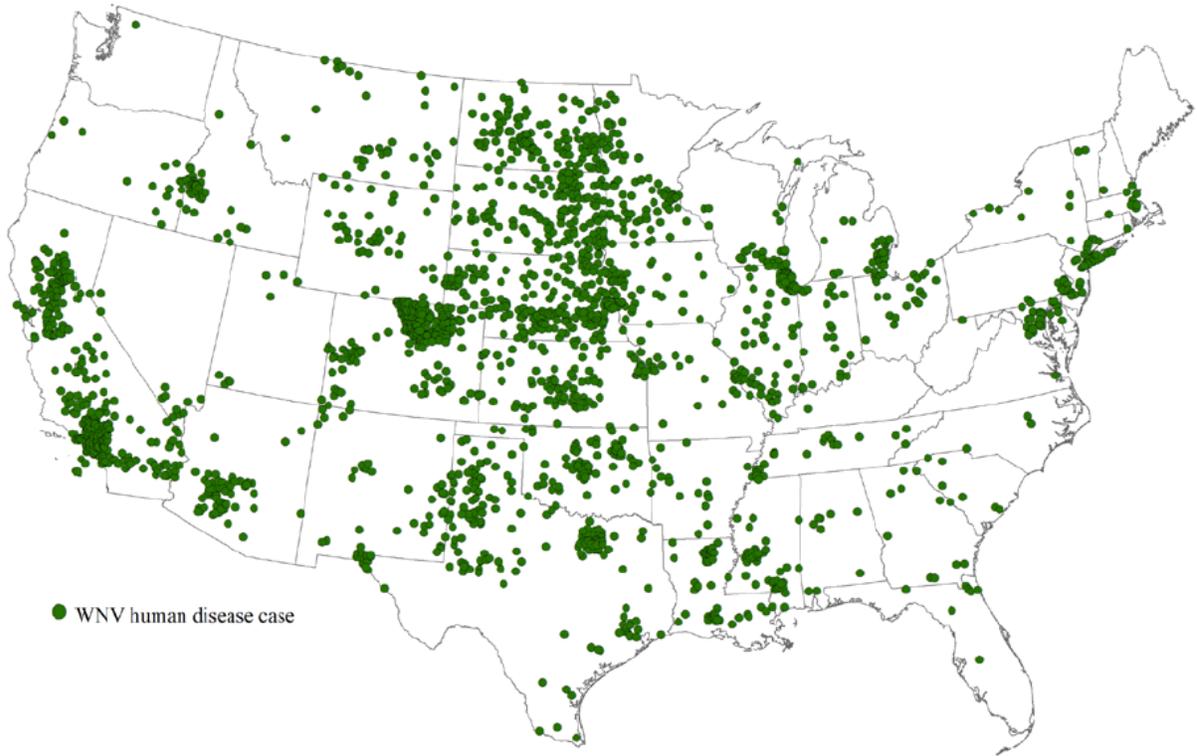


Figure 4. WNV disease cases reported to ArboNET, by county - United States, 2013

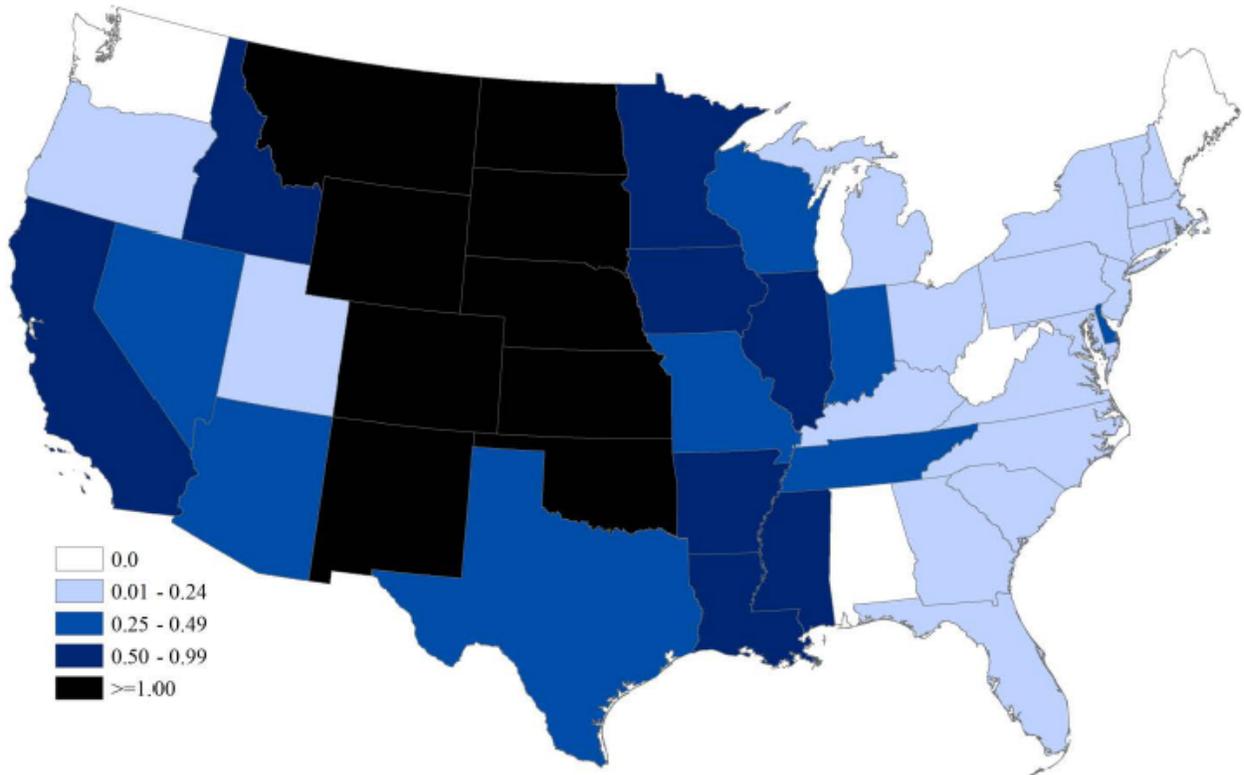


Figure 5. WNV neuroinvasive disease incidence (per 100,000 population) reported to ArboNET, by state - United States, 2013

Resources

For additional arboviral disease information and data, please visit the following websites:

Iowa Department of Public Health:

[http://www.idph.state.ia.us/Cade/DiseaseIndex.aspx?disease=West Nile Virus](http://www.idph.state.ia.us/Cade/DiseaseIndex.aspx?disease=West+Nile+Virus)

CDC's Division of Vector-Borne Diseases:

<http://www.cdc.gov/ncezid/dvbd/>

National Notifiable Diseases Surveillance System:

<http://wwwn.cdc.gov/NNDSS/script/casedef.aspx?CondYrID=616&DatePub=1/1/2011%2012:00:00%20AM>

U.S. Geological Survey (USGS):

<http://diseasemaps.usgs.gov/>

AABB (American Association of Blood Banks):

www.aabb.org/programs/biovigilance/Pages/wnv.aspx

For questions about this report, please contact:

Iowa Department of Public Health
Center for Acute Disease Epidemiology
321 E 12th Street
Des Moines, IA 50319
515-242-5935